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**REVISION E
SOIL PREPARATION WORK PLAN**

**LIBBY ASBESTOS SITE – OPERABLE UNIT 7
TROY, MONTANA**

**Prepared for:
United States Environmental Protection Agency, Region 8
Ecosystem Protection and Remediation – Program Support**

**Prepared By:
Techlaw, Inc.
16194 West 45th Drive
Golden, Colorado 80403
(303) 312-7726**

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Distribution List
Work Plan – Libby Asbestos Site – Operable Unit 7

The following is a list of personnel who will receive a copy of this Work Plan. Agency and/or contractor affiliations are also listed for each individual.

Name	Organization	Affiliation
Bonnie Lavelle	Environmental Protection Agency	Remediation Project Manager
Martin McComb	Environmental Protection Agency	Agency Representative
Mary Goldade	Environmental Protection Agency	Agency Representative
Art Tippit	Techlaw, Inc. (Corporate)	Contractor
Donald Goodrich	Techlaw, Inc. (ESAT)	Contractor
Steven Auer	Techlaw, Inc. (ESAT)	Contractor
Deborah Goeldner	Techlaw, Inc. (ESAT)	Contractor
John Calanni	Techlaw, Inc. (ESAT)	Contractor
Francisco Lapostol	Techlaw, Inc. (ESAT)	Contractor
Doug Kent	Techlaw, Inc. (ESAT)	Contractor

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Acronym List

CRZ	Contamination Reduction Zone
EPA	Environmental Protection Agency
HEPA	High Efficiency Particulate Air
IDW	Investigation-derived Wastes
MT-DEQ	Montana Department of Environmental Quality
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SPF	Sample Preparation Facility
SZ	Support Zone
TAPE	Troy Asbestos Property Evaluation
WZ	Work Zone

1.0 INTRODUCTION

This document serves as the soil preparation work plan for Operable Unit 7 of the Libby Asbestos Site, located in Troy, Montana. This work plan details requirements and procedures specific to the soil preparation activities that will occur at the Sample Preparation Facility (SPF) located in Troy. The purpose of this work plan is two fold. First, it is to provide guidance to ensure that all preparation procedures and measurements are scientifically sound and of known, acceptable, and documented quality. Second, this work plan outlines a laboratory monitoring program consisting of ambient air samples, personal air samples, and dust samples that will be implemented to determine potential exposure and cross-contamination. All requirements and activities described in the Troy Asbestos Property Evaluation (TAPE) Sampling and Analysis Plan (SAP) still apply.

The following sections and appendices are included in this work plan:

Section 1 - Introduction

Section 2 - Methods and Procedures

Section 3 - Quality Assurance/Quality Control

- Appendix A - Quality Assurance Manager Checklist
- Appendix B - Health and Safety Plan
- Appendix C - Soil Sample Preparation
- Appendix D - Packaging and Shipping of Environmental Samples
- Appendix E - Record of Deviation/Request for Modification Form

1.1 Objective

Following are the objectives of this work plan:

- *Prepare soil samples collected from locations within Operable Unit 7 for analysis.*

Sample preparation procedures will include drying, sieving, splitting, and grinding. These procedures are designed to produce a sample with well-homogenized material of a relatively standard particle size for asbestos analysis.

- *Ship prepared samples to appropriate analytical laboratories.*

Sample shipping activities will include generating Chain of Custody (COC) documentation, labeling, packaging, and physically shipping samples to the appropriate analytical laboratory.

1.2 Project Schedule and Deliverables

Sample processing will take place at the SPC by members of the Environmental Protection Agency (EPA) Region 8 Environmental Services Assistance Team (ESAT) during the following periods of the 2007 field season:

- April 16 – April 20: Mobilization

- April 30 – May 11: Air and Dust Processing
Ambient Air and Exposure Sampling (see Site Safety Plan)
- May 21- May 25 Air and Dust and Soil Processing
- June 4 – June 15 Air and Dust and Soil Processing
- July 9 – July 20 Air and Dust and Soil Processing
- Aug 20 – Aug 30 Air and Dust and Soil Processing
- Sep 24 – Oct 5 Air and Dust and Soil Processing
De-mobilization

ESAT will deliver a weekly Progress and Quality Assurance (QA) Report to the EPA and Montana Department of Environmental Quality (MT-DEQ). These reports will include the number of samples that have been completed during each step of the preparation process (i.e., receiving, drying, splitting, sieving, grinding, and shipping) and any comments regarding unusual occurrences, quality issues, and corrective actions taken. The QA portion of this report is a daily checklist as provided in Appendix A along with any notes or documentation that are required for understanding the checklist.

If any deficiencies are noted during a QA checklist review, the EPA Region 8 ESAT Project Officer and MT-DEQ Project Manager will be notified and corrective action will then be determined by all parties. If the possible, the corrective action will be immediately implemented. If the corrective action cannot or is not immediately implemented, then an improvement plan will be issued. If the actions included in the improvement plan are not completed by the due date on the plan, the EPA Region 8 ESAT Project Officer and MT-DEQ Project Manager will try to resolve the issue. If the deficiency cannot be resolved within a week after the improvement plan due date, a corrective action request form will be issued.

1.3 Sample Preparation Facility Location and Description

The SPF will be located in Troy, MT and will be housed in a former ambulance barn that is currently vacant (Figure 1.3-1). The SPF will consist of a support zone (SZ), contamination reduction zone (CRZ), work zone (WZ), and a storage area, each of which are described below.

1.3.1 Support Zone

The SZ will be accessible to individuals without personal protective equipment (PPE). This area will be located in a storage stall next to the SPF.

1.3.2 Contamination Reduction Zone

The CRZ will be located at the entrance of the ambulance barn, and will be used for donning and doffing required PPE as discussed in the health and safety plan (Appendix B). In addition, sample shipping containers (coolers or boxes) will be wiped down in this area prior to transport to the SZ for shipping.

1.3.3 Work Zone

The WZ will be located adjacent to the CRZ. Individuals entering the WZ must wear the appropriate PPE (as discussed in the health and safety plan (Appendix B)). The WZ will consist of two main areas: sample check-in and packaging, and sample processing. In the sample check-in and packaging area raw samples will be checked in prior to processing, and processed samples will be packaged for archival or shipment to the appropriate laboratory. The sample processing area will include a drying station and grinding station, each of which will be fitted with negative pressure containment chambers and vented through high efficiency particulate air (HEPA) filter units designed to remove particles less than 1 micron in diameter. Activities conducted in this area of the WZ will include drying, splitting, sieving, grinding, and weighing.

1.3.4 Storage Zone

The storage zone will be located adjacent to the WZ and used to store processed samples for shipment or archival. Individuals entering the storage zone will be required to wear appropriate PPE as described in the health and safety plan (Appendix B).

2.0 METHODS AND PROCEDURES

The following is a list of activities that will be performed by ESAT personnel at the SPF:

- Sample receipt and check-in
- Sample storage
- Sample drying
- Archive sample splitting
- Sample sieving
- Fine sample grinding
- Fine sample splitting and archiving
- Sample packaging and shipping
- Preparation measurements
- Documentation
- Equipment decontamination

All sample preparation procedures will follow the Technical Standard Operating Procedure (SOP), Soil Sample Preparation, provided in Appendix C. The following subsections may also reference other EPA and/or ESAT SOPs. The procedures followed at the soil preparation facility are shown in Figure 2.0-1.

2.1 Sample Receipt and Check-in

Field sampling personnel will stockpile samples that are collected in a storage area located adjacent to the SPF (Figure 1.3-1). The sample identification numbers and weight of all samples will be entered into an electronic soil preparation tracking form and used to verify the sample metadata exists in the Scribe Sampling Project. If the sample metadata does not exist or the identification number indicates the sample has already been processed, ESAT will notify the EPA Work Assignment Manager and the MT-DEQ Project Manager.

2.2 Sample Storage

All samples will be contained as directed in the Soil Sample Preparation SOP (Appendix C). Whenever the samples are not being processed, they will be stored in plastic totes or shipping boxes/coolers. All totes and coolers will be labeled with an inventory batch number and all coolers will be labeled with a Chain of Custody ID. The totes will be arranged by inventory batch number for easy retrieval. The samples do not require refrigeration but must be kept in an orderly, clean fashion.

2.3 Sample Drying, Splitting, Sieving, and Grinding

All samples will be dried, split, sieved, and ground in accordance with the Soil Sample Preparation SOP (Appendix C). The following is a chronological summary of the general protocol for these activities, and is further summarized in Figure 2.0-1. Samples will be transferred to the ventilation hood located in the WZ, homogenized while still in the sample bag, transferred to drying pans, covered, placed into a drying oven, uncovered, and dried. The sample will then be split, and approximately half will be archived. After the archive splitting, the sample will again be split in half if a duplicate is required, and the duplicate aliquot will follow the same procedures as the original portion. If no duplicate is required, the total sample will be sieved, and the coarse fraction will be contained for analysis (with a suffix label of labeled “C” for coarse). The finer fraction will then be ground and split into four sub-samples (with a suffix of either labeled “FG1,” “FG2,” “FG3,” and “FG4”). Three of the subsamples will be archived and when the first analysis is required for the fine fraction of the sample, the subsample labeled “FG1” will be sent for analysis. If further analyses are required for the fine ground portion, the subsequent aliquot will be sent (i.e., FG2, then FG3, etc.).

2.4 Sample Packaging and Shipping

All samples will be packaged and shipped in accordance with the Packaging and Shipping of Environmental Samples SOP (Appendix D). Chains of Custody will be created using Scribe.

2.5 Data Recording

The oven temperatures and the sample masses will be collected and recorded on the sample preparation form as indicated in the Soil Preparation SOP (Appendix C). Measurement data requirements related to for laboratory environmental and health and safety exposure monitoring are included in the Health and Safety Plan for this project (Appendix B). Additional required QA/QC documentation is described in Section 3.0

2.6 Equipment Decontamination

All equipment will be decontaminated prior to use in accordance with the Sample Preparation SOP (Appendix C). This decontamination will be conducted after and/or before each sample is in direct contact with any piece of equipment.

2.7 Investigation-Derived Waste Containment

Investigation-derived waste (IDW) consists of PPE, (i.e., tyvek and respirator filters), HEPA filters (i.e., hood and vacuum), and decontamination waste (i.e., excess sample and silica sand vacuumed from the hood and around the SPF during decontamination).

The PPE and filters will be collected after each use and stored in plastic bags (e.g., trash bags) until disposal. The decontamination waste will be stored in lidded buckets until disposal. All IDW will be double-contained and disposed of as municipal waste.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

This section details the internal QA/QC samples, equipment calibration, QA/QC checks, audits/corrective actions, and training requirements.

3.1 Quality Assurance/Quality Control Samples

Two types of QA/QC samples will be collected during the preparation process: preparation duplicates and preparation blank samples, each of which will be discussed below.

3.1.1 Preparation Duplicate Samples

Preparation duplicate samples are splits of samples submitted for sample preparation after drying but prior to sieving. These samples serve to evaluate the precision of both the sample preparation process and the laboratory analysis. One preparation duplicate sample will be processed for every 20 field samples prepared. The preparation duplicate samples are given sample identification numbers provided by sample coordination personnel. Each preparation duplicate prepared will be logged into the proper Troy Field Form (PDA) and uploaded to Scribe.

3.1.2 Preparation Blank Samples

Preparation blank samples are prepared to determine if decontamination procedures of laboratory equipment used to prepare asbestos samples are adequate to prevent cross-contamination of samples during sample preparation. The preparation blank consists of clean quartz sand. At least one preparation blank will be processed with each batch of field samples. A batch of samples is a group of samples that have been prepared together for analysis at the same time (approximately 125). The preparation blank samples are given sample identification numbers provided by sample coordination personnel. Each preparation blank will be logged into the proper Troy Field Form (PDA) and uploaded to Scribe.

3.2 Equipment Calibration

Instrumentation requiring calibration or routine function checks include sample grinders, drying ovens, ventilation hood (HEPA filter and velocity), HEPA vacuum, and the analytical balance. Table 3.2-1 summarizes the calibration procedures, frequency, and location of documentation for each piece of equipment. The following sections include a detailed description of each of the calibration procedures.

3.2.1 Grinder Calibration

The vertical plate grinder will be calibrated every day it is used and every time the disk depth is adjusted to verify target particle size. Approximately 50 to 100 grams (g) of clean quartz sand are processed through the grinder. The ground sand is then passed through a 60-mesh and a 200-mesh sieve. Calibration is successful when all of the ground sand passes through the 60-mesh sieve and some portion of the ground sand is retained

on the 200-mesh sieve. Grinder calibration is documented in the SPF logbook and on the grinder calibration and maintenance log (Soil Preparation SOP, Appendix C).

3.2.2 Drying Oven Calibration/Check

The drying oven calibration is checked once per week by setting the temperature control to 90⁰C and letting the oven come up to the set temperature. A thermometer is placed in the oven and the temperature is recorded. The acceptable criterion is +/- 1⁰C. If the calibration fails, repairs are made to the oven until recalibration of the oven is in agreement with acceptable criteria. All oven calibration will be documented in the SPF logbook and on the oven temperature calibration and maintenance log (Soil Preparation SOP, Appendix C).

3.2.3 Ventilation Hood Operating Condition Verification

Two calibration checks will be conducted on the ventilation hood. One will be a check of the hood's HEPA filter, and the second will be a check of the negative flow velocity.

The ventilation hood HEPA filter has an indicator light located on the front panel that identifies whether the filter needs to be changed. This panel will be checked daily to ensure that the HEPA filter is operating correctly. If the filter change light is on, the filter will be changed before any operations proceed in the hood. All ventilation hood operating condition verification checks and maintenance will be documented in the SPF logbook and the ventilation hood operating condition verification and maintenance log (Soil Preparation SOP, Appendix C).

The velocity of the negative flow HEPA hood will be checked with a flow meter/anemometer daily. The minimum allowable velocity in the negative flow HEPA hood will be 100 feet per minute. A line will be drawn on the hood sash frame indicating the sash location where the minimum velocity is observed. The sash will not be opened further than this point, and during grinding operations, the sash will be lowered to increase the flow velocity.

3.2.4 HEPA Vacuum Filter Check

The HEPA vacuum used to decontaminate the grinder, splitter, sieves, pans, and other decontamination areas will be checked daily for correct operations. Replacement of either the bag or filter will be performed in the hood. All vacuum checks and maintenance will be documented in the SPF logbook and the vacuum maintenance log (Soil Preparation SOP, Appendix C).

3.2.5 Analytical Balance Calibration Check

The calibration of the balance used to weigh samples will be checked daily. Class-S weights will be used to verify the internal calibration at 0.1g, 1g, 10g, and 100g. Tolerance limits for the calibration check are +/- 0.1 g. If the balance fails the calibration check, the balance will be re-calibrated. All analytical balance calibration checks and maintenance will be documented in the SPF logbook and the analytical balance calibration and maintenance log (Soil Preparation SOP, Appendix C).

3.3 Laboratory Housekeeping

The following housekeeping measures will be put in place to help ensure a safe and clean working environment. These measures are discussed further within Attachment 1 of the SPF HASP (Appendix B).

- The walls and counter top of the negative flow HEPA hood will be wet wiped and HEPA vacuumed after the completion of each day.
- Sticky mats will be placed in the doorways of the WZ, CRZ, and SZ to reduce the volume of material brought into the laboratory from the outside. Additionally, sticky mats will reduce the potential to track materials throughout the laboratory.
- Areas of sample handling and preparation, including floors, will be HEPA vacuumed and wet wiped at the end of each day.
- The sample drying oven will be HEPA vacuumed and wet wiped after each batch of samples.

3.4 Quality Assurance/Quality Control Checks

A series of QA/QC checks will be used to ensure data are accurate and recorded according to the procedures of this Work Plan, the Soil Sample Preparation SOP.

3.4.1 Sample Receipt and Check-In

At the beginning of each sample preparation period, stored samples will be checked in by two different people to verify the sample identification labels match the data collected and uploaded to Scribe. If there are any discrepancies, the EPA Region 8 ESAT Project Officer and MT-DEQ Project Manager will be notified, and the discrepancy will be corrected.

3.4.2 Sample Drying and Sieving

Once each day an ESAT member other than the sample preparer must check the batch sample preparation form to ensure all entries are complete and correct. The reviewer will initial and date the sample preparation forms after review. If any entries are not complete or correct, the person originally filling out the form will correct the form and then be retrained so that future mistakes are not made.

3.4.3 Sample Packaging and Shipping

For every sample shipment from the SPF, a second person will check the prepared COC form against the shipment contents to ensure all samples in the shipment appear on the COC form (and vice versa), all sample labels (both inside and outside bags) are correct, and there are no duplicate or missing labels. The reviewer will initial and date the COC forms after review. If there are any discrepancies, the person who originally packaged the cooler for shipment will be retrained so as to reduce the potential for future mistakes.

3.4.4 Sample Preparation Facility Calibration and Maintenance

A second person, other than the person that performed the equipment calibration and/or maintenance, must check the calibration and/or maintenance log sheets at some point during the daily operations to ensure the logs and calibration procedures were completed. The reviewer will initial and date the log sheets after review. If it is noted that the logsheets or calibration procedures have not been completed, the person who originally conducted the calibration will be retrained so that the logbooks and calibration procedures will be completed and correct in the future.

3.4.5 Documentation

This section describes the QA/QC of SPF documentation and procedures for making corrections to the SPF documentation.

Logbooks

Details regarding each sample preparation step will be recorded in the laboratory logbook. The log is an accounting of activities and will duly note problems or deviations from the governing plans and observations relating to the soil preparation activities. Information that is already recorded in log sheets (i.e., grinder calibration log, ventilation hood log, etc.) does not need to be duplicated in the log book, however daily activities performed should be included. Upon issuance of a logbook, the logbook will be given a document control number. Logbook pages will be copied at the end of each sample preparation period and turned over to the EPA. Upon completion of the logbook, it will be relinquished to the EPA. Details about what information should be recorded in the logbook are included in the above SOP. A person other than the one who completed the entries will check logbook entries at the end of each day. The logbook checks will ensure all relevant information has been recorded. If any logbook entries are incorrect or incomplete, the person originally entering the information into the logbook will be retrained so that future logbook entries are complete and correct.

Chain of Custody Requirements

The COC record is used as physical evidence of sample custody and control. This record system provides the means to identify, track, and monitor each individual sample from the point of collection through final data reporting. A complete COC record is required to accompany each shipment of samples. Upon receipt and prior to the shipment of samples, the COC should be checked against the contents of the cooler as detailed above.

Electronic Troy Asbestos Sample Tracking Information Center

The Scribe database will be used to track various pieces of information during the sample preparation process. EPA/ESAT personnel other than the person who completed the data entry will check 100% percent of the data entered into Scribe on a weekly basis.

Forms

FSDS, preparation log sheets, and calibration and maintenance logs must be completed in accordance with the Soil Sample Preparation SOP (Appendix C). When these sheets have been completed, ESAT personnel, other than the person who completed the sheet, will check to ensure the data are accurate and complete as detailed above.

Sample Labeling

As described in the Soil Sample Preparation SOP (Appendix C), suffixes are added to sample identification numbers to indicate bulk fraction, coarse fraction, fine fraction, fine, ground fraction, and the archived portion of each of these fractions. Table 3.4-1 presents the suffix identification codes and descriptions.

In addition to labeling individual samples, storage boxes are also labeled as described in the Sample Preparation SOP (Appendix C). Prior to shipment, if a sample is shipped immediately after preparation, or prior to storage of a sample, EPA/ESAT personnel will check each sample aliquot to determine if the suffix of the sample identification number corresponds to the sample appearance. The reviewer will initial and date the label after review. If it has been identified that a portion of the sample does not correlate with the aliquot associated with the label, the label will be corrected. It will also be determined why this discrepancy occurred and actions will be taken so that it will not happen in the future.

Correction to and Deviations from Documentation

A single strikeout (initialed and dated) is required for documentation changes to logbooks. The correct information should be entered in close proximity to the erroneous entry. These procedures will also be followed for corrections to any form (FSDS, log sheets, and COCs). All deviations from the guidance documents will be recorded in the logbooks and the Libby Asbestos Project Record of Deviation/Request for Modification Form (MOD) (Appendix E). All MOD forms are to be completed, approved and recorded following approval of the MT-DEQ Project Manager and the EPA ESAT Project Officer.

3.4.6 Quality Assurance/Quality Control Check Corrective Actions

Immediate actions will be taken to correct any findings during the daily QA/QC checks, if applicable. If immediate action is not applicable, an implementation plan must be completed and approved by the ESAT Project Officer, EPA, and MT-DEQ. If corrective action is immediate, the action will be documented in the SPF logbook, and the ESAT Project Officer, EPA, and MT-DEQ will be notified of the corrective action within 3 days.

3.5 Audits and Corrective Actions

An internal audit will be performed during the initial implementation of this Work Plan. If findings of this audit show the procedures of this Work Plan are not being implemented (i.e., many deficiencies are identified), an additional audit may be conducted within one week of the initial audit. An additional audit will be performed when samples are being prepared on a large scale (i.e., during full-time operation of the SPF for preparation and

full-time analysis). If significant procedural changes occur during the study, additional field audits may be conducted to ensure the new methods are implemented and followed appropriately. Audit reports will be completed following each audit and will be provided to EPA, upon request. Response actions may be implemented to correct quality problems as detailed above. All corrective actions will be documented in accordance with this Work Plan.

3.6 Training Requirements

Personnel performing sample preparation activities must have read and understood this Work Plan, the SPF health and safety plan, and all associated SOPs. In addition, personnel must have completed 40-hour Occupational Safety and Health Administration (OSHA) hazardous waste operations training and annual updates, as required. Additional training may be identified prior to project implementation and will be administered prior to any individual beginning work at the SPF.

Tables

Table 3.2-1 Calibration Summary Table

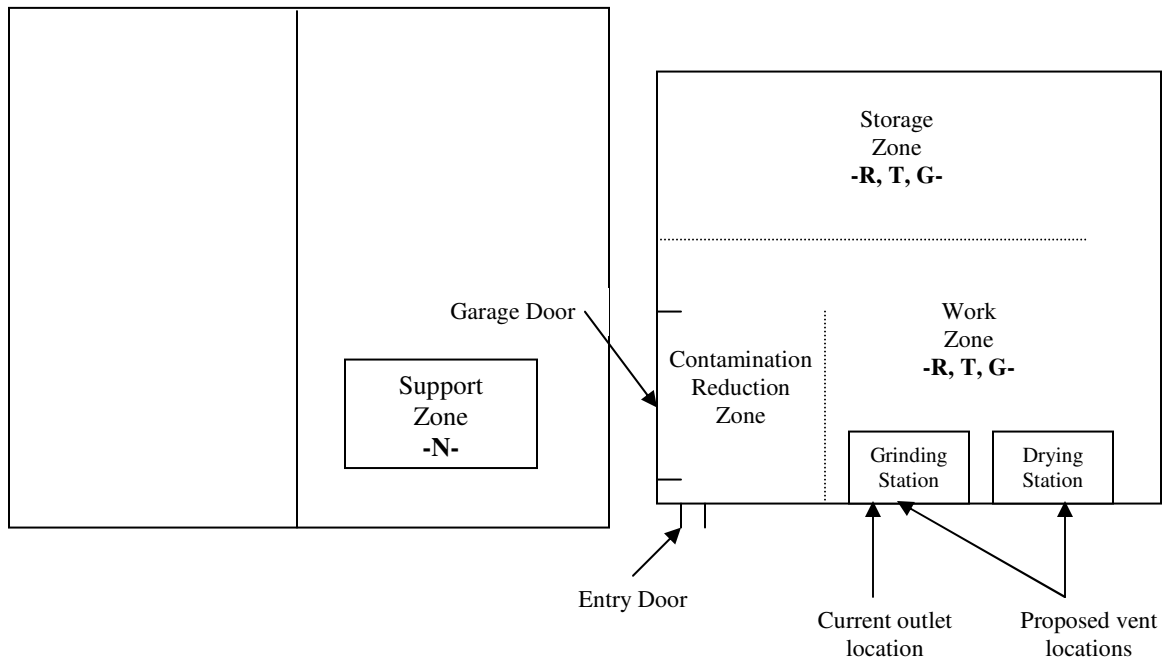
Instrument	Frequency	Where Documented
Grinder	minimum: once per day; or every time plate depth is adjusted	CSF logbook Grinder calibration and maintenance log
Drying Oven	once per week	CSF logbook, oven temperature calibration and maintenance log
Ventilation Hood HEPA Filter Velocity	daily daily	CSF logbook, ventilation hood log CSF logbook, ventilation hood log
HEPA Vacuum	as needed	CSF logbook, vacuum maintenance log
Analytical Balance	daily	CSF logbook, balance maintenance log

Table 3.4-1 Suffix Identification Codes and Description

Code	Description
C	Coarse - sample fraction that does not pass through a 1/4 -inch sieve
B	Bulk - sample fraction that passes through a 3/8-inch sieve, but is not ground
F	Fine - sample fraction that passes through a 1/4 -inch sieve
FG	Fine Ground - sample fraction that passes through a 1/4 -inch sieve and is ground to approximately 250 um
FGS	Fine Ground Sieve- sample fraction that passes through a 3/8 -inch sieve and is ground to approximately 250 um
ACA	Archive Coarse - the archived portion of the coarse fraction
ABA	Archive Bulk - the archived portion of the bulk fraction
AFA	Archive Fine - the archived portion of the fine fraction
AFGA	Archive Fine Ground - the archived portion of the fine ground fraction
AFGS	Archive Fine Ground Sample - the archived portion of the fine ground sample fraction

Figures

Figure 1.3-1 Sample Preparation Facility Layout



R – Respirator

T – Tyvek suit/chemical resistant clothing w/booties

G – Gloves

N – No PPE required

Figure 2.0-1 Soil Sample Preparation

